REMARKS

Double Patenting Rejection:

The Examiner has rejected claims 1-16 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-24 of U.S. Patent No. 6,582,590, claims 1-8 of U.S. Patent No. 6,712,955, and claims 1-18 of U.S. Patent No. 6,755,963. Terminal Disclaimers in compliance with 37 C.F.R. 1.321(c) are attached hereto to overcome these rejections.

The Examiner's Rejection Under 35 USC § 103:

Claims 1-16 were rejected under 35 USC 103(a) as being unpatentable over EP 0203228 B1 or U.S. Patent 3,619,414 or U.S. Patent 5,841,013.

EP '672 ('228?) was cited as disclosing a process for hydrotreating hydrocarbon oils employing a catalyst system arranged in stacked bed comprising an upper zone containing up to 10%w or Group VIII metal compound and 3-15%w of Group VIB metal compound, and a lower zone containing up to 10%w of Group VIII metal components and from 3-30%w of Group VIB metal components. In both zones the catalyst comprises a nickel and a molybdenum and/or tungsten component. See page 3, lines 31-45, page 4, lines 31-47, and page 5, lines 8-18. The process conditions disclosed (page 6, Table 1) read upon the claimed process conditions.

Patent '414 was cited as disclosing a process for catalytic hydrofinishing of petroleum distillate in the presence of a catalyst comprising oxides of 4-16 wt% of molybdenum and a combination of 10-25 wt% of nickel and tungsten. The process conditions disclosed read upon the claimed process conditions. See Abstract; col. 2, lines 22-42; and col. 3, line 56, to col. 4, line 23.

Patent '013 was cited as disclosing aromatics hydrogenation process in the present of a catalyst comprising a mixed metal oxide catalyst of the formula $ML(Mo_yW_{1-y}O_b)_a$ wherein M is Cr and/or one or more divalent promoter metals selected from the group consisting of Mn, Fe, Co, Ni, Cu and Zn; L is one or more ligands; and $0 \leq y \geq 1$. See Abstract; col. 1, lines 35-62; and col. 5, lines15-22. The process conditions disclosed (col. 5, lines 29-35) read upon the claimed process conditions.

None of the above references disclose the claimed molar ratio of the catalyst components.

The Examiner concluded that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the applied prior art above by determining the optimum value of a cause effective variable such as molar ratio of the catalyst components through routine experimentation.

Applicants' Response:

EP 0203228 B1 requires a stacked bed configuration wherein the upper bed catalyst comprises a Group VIB component, a Group VIII metal component and a phosphorus component. The upper bed is described on page 4, lines 21-22, as a conventional Ni- and P-containing hydrotreating catalyst. The second catalyst is a low- or no-phosphorus content conventional catalyst (page 4, lines 22-23). Thus both the upper and lower bed catalysts are conventional catalysts.

The Examiner relies on page 4, lines 39-40, and page 5, lines 8-18, to suggest applicants' trimetallic bulk metal catalyst. The Examiner will note the cited portion on page 4 relates to the first main hydrotreating catalyst. This first zone catalyst requires a phosphorus component. These catalysts are Ni-Mo-P catalysts as can be seen from page

4, lines 42-45. Suitable catalysts for the second zone are conventional Co and/or Ni containing (page 5, lines 8-9). The first and second zone catalysts differ from one another in their phosphorus content (page 5, lines 9-10). The catalysts specifically described as preferred or in the examples are Co/Ni plus Mo (see Table II).

Applicants' bulk metal catalysts do not require a phosphorus component, do not need to operate in stacked bed configuration and contain W as a required component. There is no suggestion of applicants' claimed molar ratio of components. They are not conventional as taught by the EP reference. There is no suggestion of eliminating a P component, and the EP reference requires two separate catalyst systems. Examples 5 and 6 demonstrate the results of adding W to a Ni/Mo catalyst in the claimed molar ratios.

U.S. patent 3,619,414 is cited by the Examiner as teaching a catalyst comprising oxides of 4-16 wt.% Mo and a combination of 10-25 wt.% Ni and tungsten. Col. 4, lines 3-11, discloses a catalyst comprising a hydrogenated component selected from the group consisting of sulfides and oxides of (a) a combination of about 4 to 16 percent by weight molybdenum and at least two iron group metals where the iron group metals are present in such amounts that the ratio of each iron group metal to molybdenum is less than about 0.4, and (b) a combination of about 10-25 percent by weight of nickel and tungsten where the atomic ratio of tungsten to nickel is about 1:0.3 to 4.

It is urged that while the cited passage of the '414 patent teaches 2 separate catalyst systems: (a) the combination of Mo plus at least two iron group metals and (b) the combination of Ni and W; it does not teach a catalyst system containing 4 to 16 wt.% Mo and 10-25 wt.% Ni and W. This would combine the teachings of the '414 patent in a manner not contemplated by patentee. The separate nature of the catalyst systems is illustrated in Example 1 which teaches a NiCoMo catalyst and Example 2 which teaches a NiW catalyst. There is no suggestion of applicants' catalyst system in which X (a non-noble Group VIII metal), Mo and W are combined in the molar ratio set forth in claim 1.

US patent 5,841,013 teaches a catalyst precursor and catalyst. The catalyst is prepared by:

(a) decomposing a catalyst precursor selected from the group consisting of metal amine molybdates, metal amine tungstates and mixtures thereof, wherein said metal amine catalyst precursor has the general formula

$$ML(Mo_yW_{1-y}O_4)_a$$

where M is Cr and/or one or more divalent promoter metals selected from the group consisting of Mn, Fe, Co, Ni, Cu and Zn; L is one or more neutral nitrogen-containing ligands at least one of which is a chelating polydentate ligand; $0 \leq y \leq 1$; for non-chromium containing catalysts $a=1$ and for chromium containing catalysts $0.5 \leq a \leq 3$, at a temperature of about 200.degree. C. to about 400.degree. C. in an inert atmosphere; then

(b) reducing at a temperature of about 300.degree. C. to about 450.degree. C. said metal amine catalyst precursor to form a mixed metal oxide catalyst having the general formula

$$ML(Mo_yW_{1-y}O_b)_a$$

wherein $b<4$ and M, L and y are as stated for step (a). The catalyst is described as an aromatics hydrogenation catalyst. See col. 1, lines 34-59. The purpose of the chelating ligand L is to chelate the promoter metal M. Thus the catalytic metal oxide anion $(Mo_yW_{1-y}O)^{2-}$ will be ionically bound to the chelated promoter metal cation $(ML)^{2+}$ (col. 2, lines 31-29).

The following differences between the cited reference and applicants' claimed invention are noted:

1. The catalyst claimed as a part of applicants' process does not contain a chelating ligand as required by the '013 patent.

2. Applicants' method of preparation involves an ammonium ion precursor (pages 3-4 of the specification) and the precursor is decomposed at temperatures of 300-450C (page 4 lines4-10). In contrast, the ligand in the catalyst precursor of the '013 patent is stable at these temperatures (the reducing step involves temperatures of 300 to 450C) and remains in the catalyst. Moreover, the ligand of the cited reference must be neutral (col. 2, line 33).

3. Unlike applicants' catalyst, the promoter metal of the '013 patent is bound to a chelate which is ionically bound to the catalytic metal oxide anion. This is not the same bonding as is found applicants' catalyst.

Thus, the '013 reference does not disclose applicants' claimed process since applicants use a different catalyst having a different composition prepared from a different catalyst precursor.

For the reasons noted above, it is urged that applicants have made a patentable advance in the art and is not taught or suggested by the references noted above. Applicants' catalyst composition in the claimed molar ratios is unique and not disclosed by the cited references. Thus, the subject catalyst composition cannot be determined by determining the optimum value of a cause effective variable such as molar ratio of catalyst components through routine experimentation.

The Examiner is requested to withdraw the rejections as to the present claims based on the foregoing arguments and filing of the terminal disclaimers and pass the application to allowance. The Examiner is encouraged to contact applicants' attorney should the Examiner wish to discuss this application.

Respectfully submitted:

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